FLIGHT

First Aero Weekly in the World.

A Journal devoted to the Interests, Practice, and Progress of Aerial Locomotion and Transport.

OFFICIAL ORGAN OF THE AERO CLUB OF THE UNITED KINGDOM.

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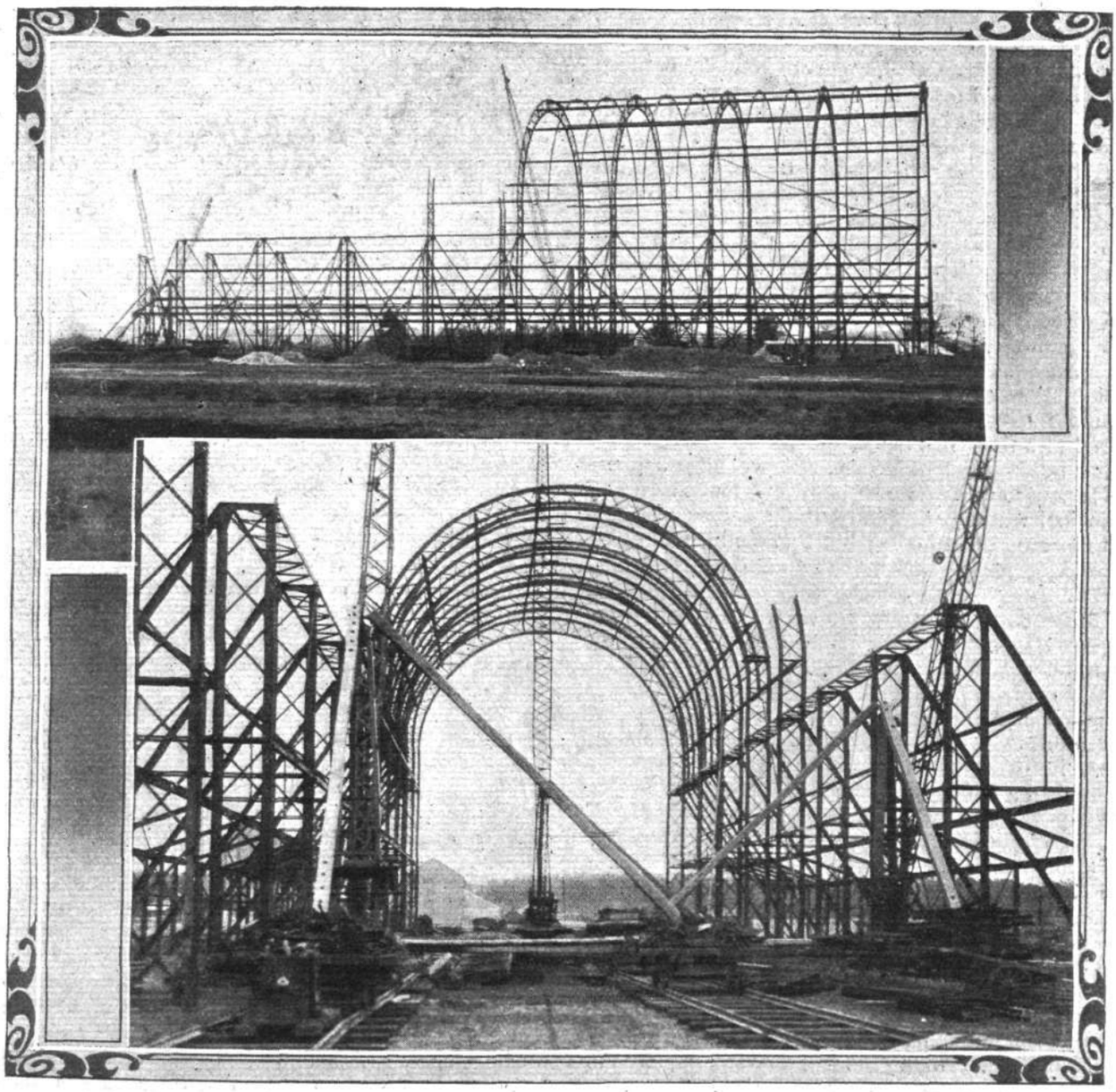

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BRITISH MILITARY AERONAUTICS.—New dirigible shed now in course of construction at Farnborough for the new British airship which will before long be ready for its house. In the background of the lower photograph the old airship sheds are seen. See special article, page 38.

A MORAL FROM FRANCE FOR BRITISH UNITY.

TIME and time again have we urged upon all those who desire to see this country take its proper place in the aeronautic councils of the world, the necessity of rallying solidly round the Aero Club of the United Kingdom and of lending their immediate aid in making that body as thoroughly representative of the British Isles as it is possible for any national institution of the kind to be. Various reasons have been advanced for this course in these columns during the past twelve months, and it has been our constant endeavour to show why that parent body with its allies—the Aeronautical Society and the Aerial League—deserve and ought to be accorded the whole-hearted support and direct membership of every go-ahead patriot, let alone of every individual who hopes to take any practical part whatsoever in the gigantic work that lies ahead of this new movement. Possibly it is not too much to say, however, that never before has there been a more telling occasion than during the past few days, when the absolute necessity for unity of action as between all those who would foster the British aeronautic industry has been exemplified in a specially striking manner, and in a way that affects the whole future prospects of the United Kingdom in relationship to those of other European countries—and of France especially. Events have in fact transpired across the Channel in connection with the arrangement by the International Federation of a calendar of events for 1910 which seem to disclose a disposition on the part of our French friends to underrate the immediate intentions of this country very considerably, by regarding the British aviator as not existent, not only now but for some little time to come, and by looking upon British aeronautic interests as being of but small account compared with those of France.

It must be admitted, of course, that we have a good deal of leeway to make up over here, and that is one of the principal reasons why enthusiastic energy urgently needs to be aroused at home; but apparently it is quite overlooked, or may perhaps be unknown to the foreigner, that inventors have been doing a vast amount of work of late in this country, even though they may not have been talking overmuch about it. And thus it is possibly hardly to be wondered at that the Frenchman has been inclined to complete his plans for the new year in advance, omitting to make proper allowance for activities in other countries. As we have already suggested above, however, it is an admirable thing for this country that it has had a strong representative body, composed of men of experience in such matters, and not merely of fresh comers into the field, with little more than enthusiasm to carry them through, and that the Aero Club of the United Kingdom has at this comparatively early stage in International aeronautical politics been able to take a firm stand. At the Conference of the past week in Paris, the overwhelming importance of France appears almost to have been sufficiently dazzling in the eyes of the Frenchman to have blinded him to the reasonable requirements of the other nations that take the lead in the civilised world. All the choicest dates throughout the coming season would apparently have been allotted cheerfully to those various towns in France that were keenly anticipating the promotion of big International meetings during the year. England, joined by Germany in particular, and backed up also by Denmark, was compelled to take a very firm stand indeed in order to prevent being outvoted at the Conference. As events turned out, the British Club was ultimately successful in upholding the rights of this country even though it involved a considerable amount of diplomacy and the adoption of an extremely firm attitude to bring that result about. But although it is satisfactory to be able to record that suitable dates were ultimately allotted to the United Kingdom for a meeting in July as well as for another in August, yet the main point that really concerns us here is one of principle and of policy alone. Here, in fact, we have a case in which any sign of weakness or of internal dissension on the part of this country might have done incalculable harm, not only to our prestige in the eyes of other nations, but actually to the business prospects of the aeronautic industry for very many years to come. The risk, it will be observed, is that of permitting France, during these earliest days when she has already acquired a useful start, to profit by that lead to the extent of using it for the purpose of maintaining it indefinitely. It is, in fact, quite bad enough that just at the present time anyone who needs a ready-made power-driven aeroplane has a bigger selection from France than over here, and one of the principal reasons why institutions like the Aero Club are founded is in order to enable experimenters and builders at home to take their proper place immediately the progress made by them is sufficient to justify it.

Just in the same way that this question for the forthcoming season has brought the A.C.U.K. very much to the fore, and has emphasised the necessity that there is for imbuing it with the fullest possible authority to speak in the councils of the world, and to exercise real power, so other events of the same kind may occur at any moment from now onwards, and a vast amount of harm be done if any display of weakness were at any time rendered unavoidable owing to national dissensions between one representative institution and another. The present, therefore, seems to be a particularly appropriate time to urge upon our readers the desirability for efforts to be put forth by them for increasing the power wielded by the Aero Club of the United Kingdom and its allies. Hence we suggest that those who have not already joined the membership of one or other of those sporting, scientific, and patriotic institutions, respectively, if not more than one of them, should send in their application forms at once, and should use their best endeavours to induce as many friends as possible to follow suit. Therein, for the immediate future, at any rate, lies the road to progress for the aeronautic movement in Great Britain.

It is not, in fact, everyone who can at the moment lend a helping hand by carrying out experiments, by building machines, or by popularising the science of flight. But there are plenty of all-British flyers, both on and off the stocks, of which a very great deal indeed will be heard between now and the time of the British July meeting, and we do not hesitate to say that the degree of satisfaction with which we and others who are interested in British aeronautics will be able to look back upon the present year at its close will depend hugely upon the extent to which the membership of these three representative bodies increases in the immediate future.

FLIGHT PIONEERS.

MR. MORTIMER SINGER.

AERIAL PROPELLERS.

AND SOME POINTS WHICH MAKE THEM INTERESTING.

(*Continued from page 25.*)

Thrust and Slip.

THE primary condition which it must obviously fulfil is that of creating a thrust (P) sufficient to overcome the resistance of the aeroplane in its line of flight. This thrust, as has already been shown, can only be maintained by imparting a rearward velocity or slip (v ft./secs.) to a mass per second (m) of still air; the value of the thrust in absolute units being given by the very simple equation $P = mv$. Expressed in words, this mathematical statement shows that the pressure or thrust of the propeller depends on the mass of air which it sets in motion per second, and on the real slip which it imparts to that mass. It will be observed, however, that increasing the speed (v) also automatically increases the mass per second (m) in the same proportion, for the mass (m) is itself an expression of ρAv where ρ is the density and A is the area of the column in motion at velocity v. It follows, therefore, that the expression $P = mv$ can be written $P = \rho Av^2$, from which the important deduction is made that whereas the thrust is only directly proportional to the area, it varies as the square of the speed of the slip.

"Disc Area."

For the above, the area may be assumed as equal to that of an imaginary disc attached to the boss of the propeller and having a diameter extending to the tips of the blades. As such a disc would have an area equal to $(\pi D^2 \div 4)$ it therefore follows that the propeller-thrust is proportional to the square of its diameter.

In order to increase the thrust when it is no longer feasible to increase the diameter of the propeller, it is necessary to increase the speed of the rearwardly moving column of air either by increasing the revolutions of the propeller itself or by increasing the pitch of its blades.

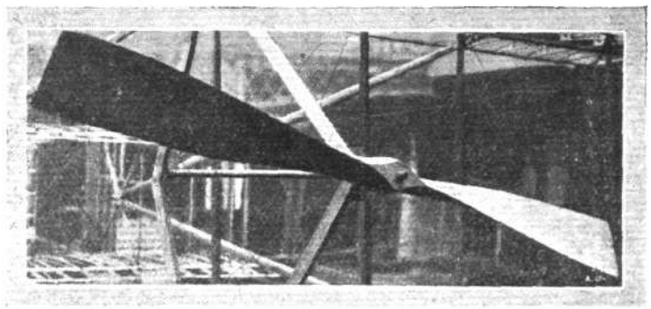
Pitch of a Propeller.

The pitch of a propeller is the distance which it will advance, due to the angle of the blades, through a solid nut in one revolution, and for any given diameter it is therefore an indirect measure of the angle which the tips of the blades would make to the plane of a disc fastened to the propeller boss. Such being the case, it does not require a very technical mind to come to the conclusion that the ratio between the pitch and the diameter is limited for practical utility, because of the churning action which would be set up by the blades if they were given too great an angle. If, for instance, they were set wholly at right angles to the imaginary disc, the device would not be a propeller at all, but a churn pure and simple. At the other extreme, if the blades had no angle at all, they would merely be equivalent to a disc revolving in a plane at right angles to the shaft. It can be shown that the intermediate value of 45° is the theoretical angle at which a blade should be set if working in frictionless fluid, but the values adopted in practice are commonly far below this, and the exact value is a factor which depends upon the skill and experience of the designer.

There is another point to be borne in mind, too, and that is that the angle of the blade is neither constant from root to tip nor constant from leading edge to trailing edge. A constant blade angle from root to tip would result in a variable pitch, and a constant blade angle from leading edge to trailing edge would produce a flat blade, which, from the analogy of the aeroplane, might well be expected to be less efficient than one suitably cambered. For approximate reckoning it is sufficiently near the mark to regard a propeller as being a portion of a helix having such variations in blade angle as will produce a constant pitch at all diameters from the boss to the periphery. As a matter of fact there are practical considerations which cause a departure from this principle, especially in propellers like those constructed of wood, where the blade itself actually does spring from the boss, and is not mounted on a separate arm.

Wood *v.* Metal.

In any propeller based on the helix principle, the blade angle essentially increases from tip to root, and there comes a point where the blade itself ceases to be any longer of value, owing to its relative inefficiency. From this point to the boss it is the designer's chief object to reduce loss rather than to gain thrust, and thus it is that in metal propellers the blades are commonly cut away entirely where they cease to be efficient, and are mounted on steel arms of circular section which offer



"Flight" Copyright Photo.

The Short propeller is constructed entirely of wood, and consists of six separate layers which are joined together to form a solid piece.

relatively small resistance to their passage through the air. In wooden propellers, where the blade is an integral part of the whole construction, considerations of strength prevent any such cutting away as this, and consequently it is usual in well designed propellers to find the blade gradually converging into a smooth stream-line form, as it approaches the boss.

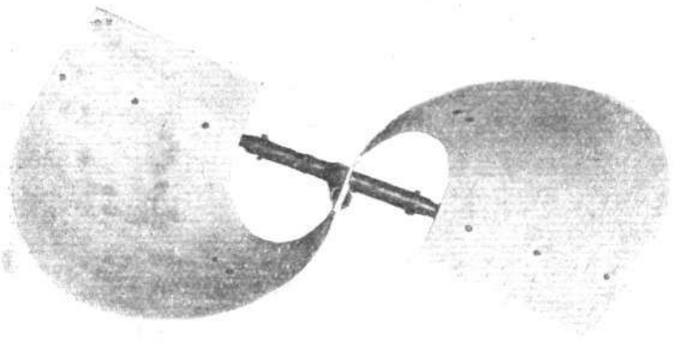
Weight and Strength.

When considering a propeller, it is not alone sufficient to have regard to its theoretical qualities, for like all else in practical mechanics, considerations of weight and strength put a limit to the achievement of ideas. Excessive weight, for instance, is the principal factor which checks the use of propellers of very large diameter, and always where there is a question of weight concerned with a moving part, the question of strength has enhanced importance. On the whole, of course, the designer's object is to use as large a propeller as possible without running up against any of the difficulties which beset his path.

"Cavitation."

There is one other consideration which is involved in an analysis of the equation ($P = mv$) for the thrust of a

propeller, and that is the effect of the revolutions per minute. With a given pitch, increasing the revolutions will increase the speed of the rearward column of air in direct proportion, and will in consequence have a similar effect upon the resultant thrust. It must be remembered,



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In the Beedle propeller the aluminium blades are made self-supporting by being bent at right angles, so that they overlap in an extension of the boss.

however, that this thrust has to be transmitted to the aeroplane through the blades of the propeller, so that once again the question of strength has to be taken into consideration. In marine propulsion there is another difficulty, for it is there found that if the pressure per sq. in. on the blades exceeds a certain value, the water gets thrown off from the surface, so that the propeller commences to revolve in a cavity. This phenomenon—known as "cavitation"—does not have to be taken into consideration in the design of the propellers for aerial work.

High and Low Speed.

Besides the question of strength, high speed involves other difficulties which are well known to all associated with mechanical apparatus. The moving parts have to be particularly well balanced, and on an aeroplane the gyroscopic force has also to be taken into account lest it interfere with the control or possibly fracture the propeller-shaft, due to a sudden swerving of the axis. Practical experience, so far as it has gone at the present day, however, seems to indicate that propellers can be satisfactorily operated at the same speed as the engine, and for the time being that is as fast as anyone is likely to wish to use them.

Efficiency.

So far, we have considered only one aspect of propulsion, that of obtaining the greatest possible thrust from the screw. It has been convenient to take this side of the question by itself, because by fixing the idea on one point at a time it shows up more clearly the natural relations which exist between what may be termed the fundamental factors in propeller design. There is the all-important question of efficiency to be taken into account, however, before final conclusions can be drawn.

It has been shown that the thrust of a propeller depends on setting a column of air in rearward motion, but what of the energy which that impressed velocity represents? In a boat it is quite obviously lost, and for the moment such may also be assumed to be the case in a flying machine; how, therefore, can it best be reduced to a minimum?

From the simple fundamental equation Energy = $0{\cdot}5\ mv^2$, it is obvious that whereas the waste is only directly proportional to the mass (m) of air in motion, it is proportional to the square of the speed (v^2), so that it is this latter factor which should be kept as low as possible.

The Best Propeller.

In Rankine's words: "That propeller is best, other things being equal, which drives astern the largest body of water at the lowest velocity."

"Flight" Copyright Photo.

The Helice integral is a wooden propeller of French construction; its blades are built up from separate layers.

The theoretical efficiency, it is interesting to note, is given by the very simple equation Efficiency $= V \div (V - 0{\cdot}5\ v)$ where V is the speed of the aeroplane, and v is the real rearward speed or slip of the column of air from the propeller.

Some of the considerations which limit the diameter of a propeller have already been discussed, as also have some of those which affect the questions of revolution, speed, and pitch. This latter factor, however, has also to be considered on its own efficiency basis, and here again a limitation of the blade angle on the lines already pointed out is indicated. It would appear to be advisable therefore to adopt an efficient angle in any case, which means that if the diameter is also made as large as possible, the revolution speed will be the sole remaining factor by means of which the other two items can be adjusted to give the thrust required.

(*To be concluded.*)

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Ae.C.F. Doings.

THE Aero Club of France have decided to send three challenges to the Aero Club of America for the Gordon-Bennett Flight Cup, and they have also entered a full team for the Gordon-Bennett Balloon Cup Race which will also be held in America this year.

It has been decided to present gold medals to Mr. Henry Farman for his duration and distance records and to Mr. Hubert Latham for the very sporting flights he has carried out on his monoplane, while silver-gilt medals are to be given to Mr. Maurice Farman and M. Jacques de Lesseps for their performances across country.

Pilote-aviateurs' certificates have recently been granted to the Hon. C. S. Rolls, Mr. Mortimer Singer, MM. Jacques de Lesseps, Molon, Bregi, Mament, Metrot, Aubrun, Balsan, and Prince Bibesco; while pilote-aeronauts' certificates have been given to MM. Pierre Clerget and Louis Godard. N. Clerget also has qualified for a balloonist's certificate.

BRITISH MILITARY AERONAUTICS.

ACTIVITY AT THE BALLOON FACTORY.

(From Our Special Correspondent.)

THERE is always an unfortunate tendency to belittle ourselves in matters appertaining to military equipment, and although it is doubtless advisable to keep the motto, "Wake up, England," to the fore, it is just as well to refrain from this cry on such occasions as there happens to be an obvious activity in the particular department to which the admonition is being applied.

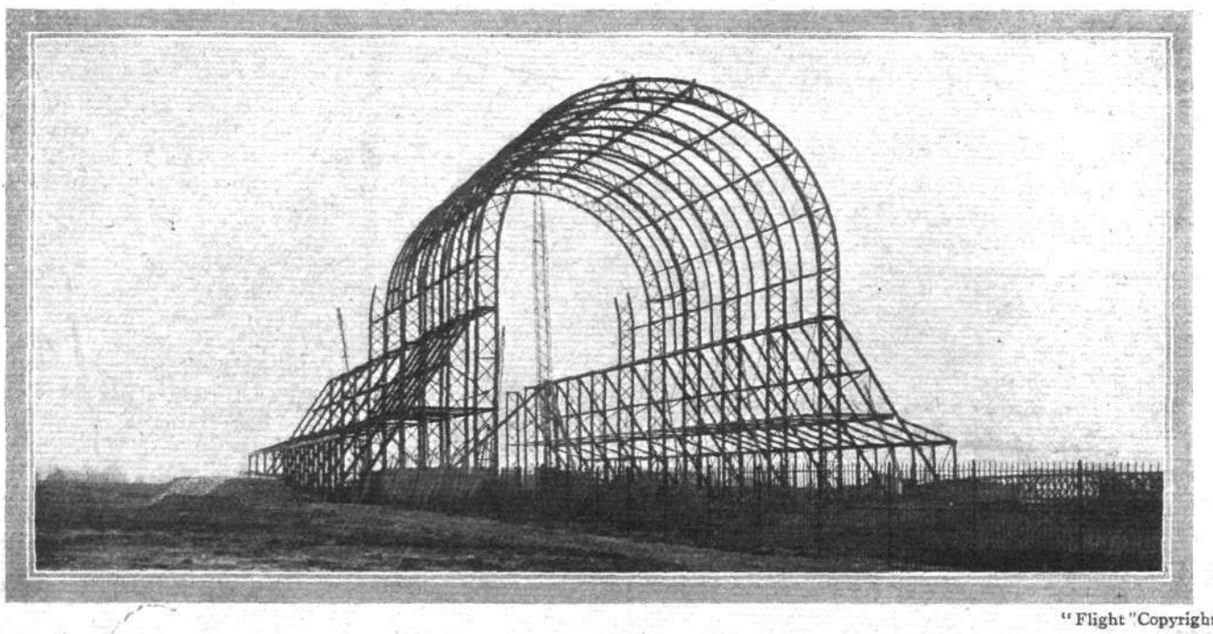
Only quite recently certain of our daily contemporaries have been exciting themselves again over the subject of national slackness in the pursuit of military aeronautics, and we feel that it is rather a pity that a personal visit was not paid to the balloon factory at Farnborough before such remarks were indulged in. Everyone is quite aware of the fact that none too much money is being spent by the Government in this particular phase of national defence, and where there is the handicap of inadequate finance it is an exceedingly difficult matter to make much of a show. When, however, it is possible to see from the high-roads such an imposing erection as forms the subject of the accompanying photographs that were taken at South Farnborough one day last week, it must be fairly obvious to the merest tyro that the authorities are not asleep.

Important changes have, as our readers are aware, taken place in connection with the control of the various departments associated with military aeronautics, the outstanding departure having been the appointment of a civilian, Mr. Mervyn O'Gorman—a well-known consulting engineer and automobile expert—to the post of Superintendent of the Military Balloon Factory. Hitherto Colonel Capper succeeded, out of his indomitable energy, in looking after this large and important work in addition to his proper duties as Commandant of the Military Balloon School, which in war time provides the balloon companies that are attached to the fighting forces. How one man could ever be expected to run a factory, design dirigibles, aeroplanes, and other such machines, in addition to instructing soldiers in the art of aerial warfare, is somewhat of a mystery, but Colonel Capper made an attempt that has gone a long way towards laying the foundation of what we hope will in time develop into the finest military equipment in the world.

Now that the two departments have been separated, each should progress apace; it is, as we have mentioned, only necessary to look from the road-side to see that developments have already taken place since Mr. Mervyn O'Gorman's accession to the office of Superintendent of the factory. Quite close to the works on Cove Common there is being built, as our photographs show, a large hangar for a dirigible.

Already five out of the ultimate thirteen principal members are erected, and when it is finished the shed will measure 324 ft. long exclusive of a semi-circular end at one extremity. The inside width is 60 ft., and the extreme inside height 75 ft., the height to the springing of the arches being 45 ft. The base width of the construction on the ground line measures 115 ft. wide over all, the principals being supported on massive concrete blocks sunk some eight feet into the ground, and reinforced by buttresses so arranged that the triangular space enclosed by them is apparently going to be used as long sheds on either side of the main building. The constructive work is being carried out by the Cleveland Bridge and Engineering Co., of Darlington, and judging by the present rate of progress ought to be finished within two months.

What the shed will accommodate when it is finished remains to be seen, but it is perfectly obvious that only one dirigible of any appreciable size can be accommodated at the factory with its present equipment. As our readers know, two airships are expected in this country from France, and should either or both of them stay here, we imagine it is not improbable that this shed may



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BRITISH MILITARY AERONAUTICS.—Half side view of the new dirigible shed being constructed at Farnborough.

afford a home for one of them; dirigible sheds are not yet so numerous in the vicinity of London that they are likely to follow the present slump in house property.

There remains the shed that is already in existence; the shed that housed "Nulli-Secundus" and is at present the home of the "Baby." So far as is publicly known, the "Baby" is at present the sole occupant of this shed, but for our own part we have our doubts. There has been more material going into that shed than ever the "Baby" could find room for or than has yet come out again in any recognisable form. We shall be sadly mistaken if something very much like a large dirigible does not sail valiantly through those doors one of these fine days, and on a fine day in the very near future, too, if the Clerk of the Weather cares to keep the elements in check a little while longer.

We shall see what we shall see, but readers of FLIGHT may take it for granted that Cove Common, South Farnborough, is going to be quite an interesting place again in the near future.

MONOPLANE *v.* MULTIPLANES.

By A. V. ROE.

AT the recent Authors' Dinner the Hon. C. S. Rolls said "It seems fairly certain that for the moment triplanes or multiplanes will not be successful." When Mr. Rolls uttered these words he surely must have overlooked that an English triplane made a number of flights last July and August with only a 9-h.p. J.A.P. engine, having two air-cooled cylinders of only 85 mm. bore and 92 mm. stroke.

As far as the writer is aware no monoplane or biplane has ever approached this result, and this speaks very highly of the future possibilities of the triplane. At present the monoplane is undoubtedly the most graceful of flyers, but other things besides appearances must be taken into consideration. In my case efforts have and are being devoted to producing a light handy machine, for obviously the smaller and lighter the aeroplane, the less likely is the aviator to find himself in trouble when taking cross-country trips.

Naturally one would ask, "What are the advantages of the triplane?" Firstly, the triplane is only one-third the size of a monoplane, roughly speaking, of the same area, and consequently the aeroplane portion is reduced to *one-sixth* of the weight. As there is such a reduction in size the strains are reduced considerably, and the angle of the wing is not so acute as in the monoplane, one can more easily get a higher aspect-ratio with greater cutting edge, and this gives greater lifting power per square foot of surface.

Monoplane enthusiasts say there is a loss of efficiency through superimposing the planes; but it has been proved that for angles of less than 15°, the interference is practically nil, when planes are at their own depth apart. The main planes being narrow, the tail can more easily be kept several depths apart from these, and consequently they can carry the same weight per sq. ft. as main planes. The writer found his 9-h.p. aeroplane would not fly unless it carried the same weight per sq. ft. on all the planes, that is to say, more than 9-h.p. was required to make it fly under those conditions. Others may raise objection to the triplane, stating there are too many wires and complications; as a matter of fact there is much less wiring in a triplane than a biplane of equal area.

Stability is perhaps the most important feature of an aeroplane, and in this respect I consider the three types mentioned above will all prove to be very much alike, when constructed on approved lines. At present the Antoinette monoplane holds the world's record for manœuvring in rough weather, and this I consider is greatly due to the dihedral angle of wings.

Perhaps non-advocates of the triplane may consider the triplane unstable owing to my accident on December 24th. This was due to making a sudden turn; the inside quickly sank owing to the reduced speed on that side. I relied solely, as I had often done before, on the twisting to bring this back again (which, by the way, had been recently reduced as it seemed unnecessary to have the amount originally used) but this was not enough, and before I thought of using the rear vertical rudder to turn the machine round and so increase speed on the falling side, the machine struck the ground heavily. Had the machine been a monoplane of same area and consequently greater span, and had such a sharp turn been made, this action would have been still more pronounced, as the tips of the monoplane would have been travelling relatively slower on the inside and faster on the out than those of the smaller span triplane.

Some pilots may think they have perfect control of an aeroplane after their third flight, but it seems to me a hundred flights are not sufficient to prevent the learning of some little dodge each time.

As regards quadruplanes and multiplanes, having more decks still, these no doubt will come along in the near future, but each type necessitates a considerable amount of experimental work.

12½ Miles Up in the Air.

MR. W. H. DINES, who is conducting some experiments in connection with the temperature of the upper atmosphere, was able to give recently the results obtained with some small balloons equipped with registering apparatus. Eight such balloons were sent up from Crinan, Argyllshire, and three have been recovered, one near Oban, another at Sanquhar, and a third at Biggar. Two of them reached an altitude of 12½ miles, and while the temperature at seven miles high at one reading of the instruments was 60 degrees F., at another it showed 90 degrees F.

Flying Over Lake Geneva.

THE organisation of flying races across Lake Geneva, to which we referred recently, is now taking definite shape, and an event is being arranged to take place from Renens, just by Lausanne, to Evian-les-Bains, the date suggested being between June 19th and 26th. The distance between the two landing places would be 14 kilometres, and in view of the fact that one is on Swiss territory and the other in France, the meeting would naturally assume an International character, the Aero Clubs of Switzerland and France sharing the responsibility of organisation.

The Aero Club of the United Kingdom

OFFICIAL NOTICES TO MEMBERS

Committee Meeting.

A meeting of the Committee was held on Tuesday, the 11th inst., when there were present:—Mr. Martin Dale, in the chair, Mr. Ernest C. Bucknall, The Earl of Hardwicke, Prof. A. K. Huntington, Mr. J. T. C. Moore-Brabazon, M. C. F. Pollock, Hon. C. S. Rolls, Mr. J. Lyons Sampson, Mr. Stanley Spooner. Capt. E. Claremont and Harold E. Perrin, joint secretaries.

New Members.—The following new members were elected:—

R. E. Belilios.	Eric Raymond Loder.
Capt. R. Cave-Brown-Cave, R.N.	Henry John Lloyd.
Norbet A. Chereau.	Stephen F. B. Lynch.
Aubrey Ransford Collet.	A. S. L. Mackintosh.
Lieut. Gerald Joseph Crean.	W. S. L. Mackintosh.
G. de Havilland.	George Macmillan.
Maj. John Herbert Dickson.	John Fitzgerald Mahon.
John Dones.	Keith H. Marshall.
Edward James Edwards.	Baron Pontenani.
Harold Bulmer Everett.	J. R. Porter.
Col. J. D. Fullerton, R.E.	H. V. Roe.
C. R. Garrard.	Henry John Rogers.
Arthur Gibbs.	Guy N. Rouse.
John Godsal.	Thomas Sowland.
Harry J. Gully.	Stuart Morse Townsend.
Richard Price Haig.	William Harold Tribe.
Bruce Sandford Kemp.	A. O. Warren.
Esme Gordon Lennox.	J. E. Withers.

Membership.

The 1,000 Founder Members are now complete, and new members will, therefore, be charged an entrance fee of two guineas in addition to the annual subscription of two guineas.

Aero Exhibition at Olympia.

The full particulars regarding the Model Section will be issued this week, and a supply will be sent to each provincial aero club for distribution amongst its members. Space will be given free, and the Aero Club will erect suitable stands and provide the necessary attendants. In order to partly cover this expense a charge of 10s. will be made to each exhibitor, who will be provided with a free pass during the whole exhibition.

Medals will be awarded by the Aero Club and the Aerial League of the British Empire.

Entries and all inquiries must be made to the Aero Club, 166, Piccadilly, London, W.

Members wishing to exhibit full-sized machines are requested to communicate at once with the Aero Club.

New Premises.

The club premises are now open, and the many members who have been into the Club since its opening have all expressed their satisfaction at the arrangements which have been made for their comfort.

International Aeronautical Federation.

The Chairman, Mr. Roger Wallace, and Captain E. Claremont, one of the Joint Secretaries, attended the meeting in Paris of the Bureau of the International Aeronautical Federation on Monday, the 10th inst., and dates for International Meetings were allocated to England, July 11th to 16th, and August 6th to 13th. The Committee will shortly consider applications for these dates.

Heliopolis (Cairo) Aviation Meeting.

The Heliopolis aviation meeting commences on 6th February next, and nearly all the well-known aviators will compete. Mr. A. Mortimer Singer will represent the Aero Club, and after his recent performances at Chalons, it is hoped that he will be successful in some of the competitions. Mr. Singer will use a Henry Farman machine. Mr. J. E. Neale, also a member of the Aero Club, will probably take part in the competitions.

Association with the Aero Club.

The Scottish Aeronautical Society have associated themselves with the Aero Club of the United Kingdom, and negotiations are also proceeding with several of the larger provincial clubs in England.

Aero Club Prize.

Mr. J. T. C. Moore-Brabazon, on the 7th inst., made a flight from Shellbeach to Eastchurch, and has been awarded one of the Aero Club prizes of £25.

Alexander £1,000 Prize Competition.

Copies of the rules and entry forms for this competition for aerial motors can be obtained from the Secretaries.

The British Empire Michelin Cup.

The Michelin Tyre Co. has presented to the Aero Club of the United Kingdom, for competition by British aviators, a trophy of the total value of £500.

Annually, for five years, a replica of this trophy, together with a sum of £500 in cash, will be given to the successful competitor. This trophy will be competed for under the following conditions, *which shall apply for the first year only*:—

Conditions.—1. The holder of the cup for 1909 will be the competitor who, on March 31st, 1910, shall have accomplished the greatest distance on any heavier-than-air machine without touching the ground.

2. The minimum distance to be covered in order to qualify for this prize shall be 5 miles round two or more posts for the necessary number of circuits.

3. Entries must be made in writing to the Secretary of the Aero Club, 166, Piccadilly, London, W. At least two clear days' notice must be given by a competitor before making his attempt.

4. An entrance fee of 10s. will be charged, and a further sum of £1 must accompany every notification of an attempt by any competitor under these rules. Every competitor must be a member of some recognised body dealing with aerial matters in the Empire, and shall, if called upon, satisfy the officials of the Aero Club of his ability to fly at least 500 yards, before making any attempt under these rules.

5. All attempts must be made between the hours of sunrise and sunset, in the presence of the official or officials appointed by the Committee of the Aero Club.

6. The recognised flying ground is at Shellbeach, Island of Sheppey, but the Committee of the Aero Club will be willing to entertain any other ground subject to the competitor paying the necessary expenses incurred.

7. The start for the records will be reckoned from the crossing over the starting line in actual flight.

8. Competitors must be British subjects from any part of the Empire, manipulating a British-made machine. All the principal parts of a competing machine must be British made. All decisions applying to this rule shall be given by the Chairman of the Aero Club, Mr. Roger W. Wallace, K.C., and failing him, by an arbitrator nominated by the President of the Institution of Civil Engineers. This shall not be held to apply to raw material, but all finished or manufactured parts of such machine must comply with the above condition.

9. The decision of the officials of the Aero Club on all matters connected with this competition to be final and without appeal.

E. CLAREMONT, CAPT. R.N.,
HAROLD E. PERRIN,
Joint Secretaries.

166, Piccadilly.

Who Have Flown over an Hour.

NINETEEN flyers at present can claim to have flown continuously for more than an hour. They are as follows, the names being set out in alphabetical order:—

Jacques Balsan, Louis Blériot, de Caters, Edouard Chateau, S. F. Cody, Engelhardt, Henry Farman, Grade, de Lambert, Hubert Latham, Jacques de Lesseps, Paulhan, Rougier, Mortimer Singer, Sommer, Tissandier, Van den Born, Orville Wright, Wilbur Wright.

PROGRESS OF FLIGHT ABOUT THE COUNTRY.

(NOTE.—Addresses, temporary or permanent, follow in each case the names of the clubs, where communications of our readers can be addressed direct to the Secretary. We would ask Club Secretaries in future to see that the notes regarding their Clubs reach the Editor of FLIGHT, 44, St. Martin's Lane, London, W.C., by 12 noon on Wednesday at latest.)

Aviation Association of Ireland (HOTEL METROPOLE, DUBLIN).

THERE was a considerable attendance at the Hotel Metropole on the 7th inst., when a meeting of the Aviation Association of Ireland was held under the presidency of Mr. John Boyd Dunlop, who gave it as his opinion that there was too strong an idea among inventors of aeroplanes to use bolts and screws too largely. Those interested in aviation should take a lesson from sailors, who made the most of ropes.

Mr. Dunlop then proceeded to give a demonstration of the properties of fans or propellers.

It was unanimously agreed that Mr. Dunlop should be the president of the association, and Dr. Lilly the vice-president. The following were elected as the committee:—Messrs. R. J. Mecredy, J. C. Percy, J.P., George E. Shanahan, A. E. Porte, George Wilson, D. Gill, H. Stuart Doig, C. E. Wright, G. D. Scally, and R. Dunphy. The secretaries, Mr. G. Hatton and Mr. F. F. C. Trench, were elected treasurers.

Oldham Aero Club (5, CHURCH TERRACE).

THE usual weekly meeting was held on Thursday last, December 30th, 1909, at headquarters, when a paper was contributed by Mr. E. Rogerson upon "Petrol Engines."

The essayist treated the subject from a practical standpoint, and in all cases where technical terms were necessary explained them fully before proceeding with his paper. A lengthy discussion followed, which elicited much information of an interesting and instructive nature.

The prospects of this club are exceedingly healthy, there being no lack of enthusiasm amongst its members.

S.W. England Aeronautical Soc. (51, ST. LEONARD'S RD., E SHEEN)

AT a meeting of the above Society, held on the 9th inst., at the Ship Hotel, Hammersmith, a fund was started for the club monoplane, which was headed by Messrs. Surley Smith, Mateyka, Cochrane, Johnson, and Kennington, who contributed £1 each, and others; realising in all £8. The chassis of the club's monoplane is now waiting for the wings, which are in course of construction. Every effort is being made to have it ready for flight about the middle of March. A model competition is being organised to take place about April 20th. The entrance fee will be 1s., and a charge will be made of 1s. 6d. for every model entered. Entries close on March 30th. No special qualifications are necessary, but prizes will be given for length of flight and workmanship, as determined by the judges.

Yorkshire Aero Club (63, ALBION STREET, LEEDS).

ON January 4th Mr. C. H. Kruger gave his lecture on "Kites and the Principles of Flight Embodied Therein," and his remarks gave his own experience and the results obtained by his experiments. The next lecture on Tuesday, the 18th inst., will be by Mr. Ivan Fawcett on "The Utility of Aero Clubs and Aviation Meetings."

OFFICIAL FRENCH RECORDS TO DECEMBER 31st.

IN our issue of Jan. 2nd, 1909, we published a series of tables showing the progress of mechanical flight together with the individual achievements of the leading aviators. As a companion to those figures we now give a table showing the various performances which had been officially recorded in France up to the end of 1909. Although the first recorded flights of Santos Dumont and Henry Farman were under the minimum distance of one kilometre, their speeds were officially passed as 41·292 and 52·7 kiloms. per hour respectively.

DURATION AND DISTANCE RECORDS.

Pilot.	Date.	Place.	Duration. h. m. s.	Distance.
Santos Dumont	Nov. 12, '06	Bagatelle	0 0 21 1/5	220 metres
Henry Farman...	Oct. 26, '07	Issy ...	0 0 52 3/5	770 ,,
,, ...	Jan. 13, '08	,, ...	0 1 28	1 kilom.
,, ...	Mar. 21, '08	,, ...	0 3 39	2·004 kils.
Leon Delagrange	Ap. 11, '08	,, ...	0 15 26 4/5	3·925 ,,
,,	May 30, '08	Rome ...	0 6 30	12·750 ,,
Henry Farman ..	July 6, '08	Issy ...	0 20 19 2/5	—
Leon Delagrange	Sep. 6, '08	,, ...	0 29 53 3/5	24·125 ,,
Wilbur Wright...	Sep. 21, '08	Auvours	1 31 25 4/5	66·6 ,,
,, ...	Dec. 18, '08	,,	1 54 53 3/5	99·8 ,,
,, ...	Dec. 31, '08	,,	2 20 23 1/5	124·7 ,,
L. Paulhan ...	Aug. 25, '09	Rheims	2 43 24 2/5	134 ,,
Hubert Latham	Aug. 26, '09	,,	—	154·62 ,,
Henry Farman...	Aug. 27, '09	,,	3 4 56 2/5	180 ,,
,, ...	Nov. 3, '09	Chalons	4 17 53 2/5	234·212 ,,

SPEED RECORDS.

kiloms.	Pilot.			h. m. s.
1 ...	Delagrange ...	May 31, '09 ...	Juvisy ...	0 1 18 2/5
...	Capt. Ferber	Sep. 3, '09 ...	,, ...	0 1 15
2 ...	W. Wright ...	Sep. 21, '08 ...	Auvours ...	0 2 44
5 ...	Tissandier ...	May 20, '09 ...	Pont Long...	0 5 26 2/5
10 ...	W. Wright ..	Sep. 21, '08 ...	Auvours ...	0 13 13 1/5
...	Tissandier ...	May 20, '09 ...	Pont Long...	0 10 46
...	Blériot ..	Aug., '09 ...	Rheims ...	0 7 47 3/5
20 ...	W. Wright ...	Sep. 21, '08 ...	Auvours ...	0 26 13 2/5
...	Tissandier ...	May 20, '09 ...	Pont Long...	0 21 29 3/5
...	Curtiss ...	Aug., '09 ...	Rheims ...	0 15 50 2/5
30 ...	W. Wright ...	Sep. 21, '08 ...	Auvours ...	0 39 28
...	Tissandier ...	May 20, '09 ...	Pont Long...	0 32 28 1/5
...	Curtiss ...	Aug., '09 ...	Rheims ...	0 23 29 3/5
40 ...	W. Wright ...	Sep. 21, '08 ...	Auvours ...	0 52 48
	Tissandier ...	May 20, '09 ...	Pont Long...	0 43 19
	Latham ...	Aug., '09 ...	Rheims ...	0 34 55
50 ...	W. Wright ...	Sep. 21, '08 ...	Auvours ...	1 6 46 3/5
	Tissandier ...	May 20, '09 ...	Pont Long...	0 54 8 4/5
	Latham ...	Aug., '09 ...	Rheims ...	0 43 56
60 ...	W. Wright ...	Sep. 21, '08 ...	Auvours ...	1 21 33 2/5
	Latham ...	Aug., '09 ...	Rheims ...	0 52 44 2/5
70 ...	Latham ...	,, ...	,, ...	1 3 6
80 ...	,, ...	,, ...	,, ...	1 11 26 2/5
90 ...	,, ...	,, ...	,, ...	1 19 56 2/5
100 ...	,, ...	,, ...	,, ...	1 28 17
150 ...	,, ...	,, ...	,, ...	2 13 9 3/5
200 ...	H. Farman ...	Nov. 3, '09 ...	,, ...	3 42 34

TIME RECORDS.

hours				Distance.
0 1/4 ...	Tissandier	May 20, '09	Pont Long ...	12·5 kils.
0 1/2 ...	W. Wright	Sep. 21, '08...	Auvours ...	22 ,,
...	Tissandier	May 20, '09...	Pont Long ...	27·5 ,,
1 ...	,,	,, ...	,, ...	55 ,,
2 ...	H. Farman	Nov. 3, '09 ...	Chalons ...	108·93 ,,
3 ...	,,	,, ...	,, ...	162·276 ,,
4 ...	,,	,, ...	,, ...	215·622 ,,

PASSENGER RECORDS (one passenger besides pilot).

Duration.

				h. m. s.
W. Wright (with M. F. Reichel)	Oct. 3, '08	Auvours	0 55 33 3/5
,, (with M. Painleve)...	Oct. 10, '08	,,	1 9 45 3/5

Distance.

W. Wright (with M. Painleve)..	Oct. 10, '08	,,	58 kiloms.

Speed.

10 kiloms....	H. Farman ...	Aug. 28 ...	Rheims ...	0 9 52 1/4

With two Passengers.

10 kiloms....	H. Farman ...	Aug. 28 ...	Rheims ...	0 10 39

HEIGHT RECORDS.

Latham	Aug., '09 ...	Rheims ...	155 metres
Count Lambert ...	Oct. 18, '09 ...	Paris ...	300 ,,
Latham	Dec. 1, '09 ...	Chalons ...	453 ,,

AIRSHIP SPEED RECORDS.

				h. m. s.
10 kiloms. ...	"Col. Renard" ...	Aug., '09 ...	0 16 31
20 ,, ...	,, ...	,, ...	0 31 58 2/5
30 ,, ...	,, ...	,, ...	0 48 31 1/5
40 ,, ...	,, ...	,, ...	1 3 28 2/5
50 ,, ...	,, ...	,, ...	1 19 49 1/5

AVIATION NEWS OF THE WEEK.

Cross-Country Flying at Shellbeach.

ON Friday of last week Mr. J. T. C. Moore-Brabazon paid a visit to the Aero Club's new auxiliary ground at Eastchurch, flying across from Shellbeach against a 12-mile wind, a distance of about 4½ miles. His mount was the "Short" biplane with which he recently won the *Daily Mail* £1,000 prize. Incidentally he also secured one of the Aero Club's prizes for short-distance flights.

Hon. C. S. Rolls Flies in France.

DURING a recent visit to France, the Hon. C. S. Rolls took the opportunity to run down to Chalons and had one or two trips with Henry Farman and Latham on their respective machines, the latter indulging in some extra smart turning movements for the particular entertainment of his visitor.

Flying a Kilometre High.

IF on January 13th, 1908, when Farman first succeeded in flying for more than a kilometre, anyone had dared to suggest that within two years it would be possible to fly at a *height* of a kilometre, they would have received little sympathy for their optimism. Yet on Friday of last week, with the consummate ease so characteristic of himself, Mr. Hubert Latham rose from Chalons Camp on his Antoinette monoplane and gradually climbed up into space until the barometer he had hung round his neck registered 1,100 metres. Then he gradually descended in wide sweeping circles, and came to rest 42 mins. 11⅘ secs. after the start. The weather was beautiful and the wind only blowing at about eleven miles an hour, so that the conditions were favourable.

Questioned as to the possibility of flying still higher, Mr. Latham said he saw no reason why it should not be so. His impressions were just the same as usual, and he rose as high as he pleased because his machine was running splendidly.

The height was also measured by some military officers under General Journe, and they returned the altitude reached as 830 metres.

Another Farman Pupil Flies 1 hr. 16 mins.

ON the 5th Van den Born, one of the latest of Mr. Henry Farman's pupils, took the air at Chalons with the intention of flying for an hour, and actually he remained up for 1 hr. 16 mins. On the following day both Mr. Henry Farman and Van den Born each flew for 20 kiloms., while M. Mitchell, a new pupil, made a couple of circuits of the camp. Herr Frey, another new pupil, was not so successful, and fell from a height of about 4 metres, smashing the right wing and the front part of the machine. On the 8th inst., Van den Born intended to fly for three hours, but trouble with the carburettor caused him to land after flying for 56 mins., during which about 52 kiloms. were traversed.

AT FRANKFORT FLIGHT EXHIBITION.—A reminiscence of 1870. Some envelopes which were despatched by balloon post from Paris during the siege, to Germany, &c.

Ae.C.F. Prizes Disposed of.

AT their last sitting, the Committee of the Aero Club of France confirmed their awards for the several prizes, the competition for which closed at the end of the year. M. Paulhan took the first prize of 5,000 francs in the Prix de la Tenue de l'Air with 653·776 kiloms., Tissandier was second, 2,500 francs, with 315·41 kiloms., Blériot third, 1,000 francs, 191·2 kiloms., and Delagrange fourth, 500 francs, 76·25 kiloms. M. Blériot was awarded the Prix du Voyage for his trip from Etampes to Orleans, 41·2 kiloms., and being both pilot and builder of his machine, took the first two prizes of 5,000 and 4,000 francs, while M. Chauvière, as maker of the propeller, took 2,000 francs. The Michelin Cup was awarded to Mr. Henry Farman for his record of 234·212 kiloms. at Chalons, on November 2nd last, while the Archdeacon Cup was secured by M. Leblanc for his flight of 22·5 kiloms. at Pau, on December 31st last.

Flying at Pau.

LIEUT. AQUAVIVA, the first of the French Government pupils to attend the Blériot School, has been receiving tuition since the 5th inst. On that day M. Leblanc easily carried out the first flight for the Montefiore Friant prize, and, having also accomplished without difficulty the other two necessary trials on the 8th and 11th, eventually secured the prize. During the past week several of the pupils have been making short flights each

day. At the Wright aerodrome, Tissandier has made many trials of 25 minutes, sometimes accompanied by a pupil, sometimes alone.

Calendar of Flight Events.

AT the meeting of the Federation Aeronautique Internationale, held at the Aero Club of France on Monday last, the sitting, although it lasted for some seven hours, was mainly devoted to the arrangement of the calendar of flying meetings to be held this year. A list of dates proposed for French meetings was presented, and a huge number of representatives of the organisers of this meeting were admitted to the conference chamber. This led to a fierce discussion, for two meetings were proposed at Rheims, which clashed with one of the two British dates asked for, so that Mr. Roger W. Wallace, Chairman of the Aero Club of the U.K., had to make a firm stand before he carried his point. He protested against the claims of Great Britain being ignored, and even threatened to withdraw from the conference, in which action he was supported by the German and Swedish representatives. Eventually a compromise was arrived at, and Great Britain was allotted from July 11th to 16th and also from August 6th to 13th.

The other dates will be found included in chronological order in our diary of forthcoming events on page 48.

Practice at Issy.

THE outstanding event at Issy last week-end was the spectacular flying of Rougier on the 7th inst. Flying with the greatest ease he made several circuits of the camp and gradually flew wider and wider until he was passing over the Seine and above Grenelle. He eventually landed by a gliding flight from a height of about 100 metres. Later in the day Rougier again repeated this performance, except that he then glided down from a height of 150 metres. Newcomers to Issy are MM. Bothy and Soufrougel, two Belgian aviators who are experimenting with a monoplane, which has a tail similar to the Santos Dumont machine. Several flights of about 300 to 500 metres have been made on the machine.

Another new monoplane is the Thauris which M. Paul de Lesseps has been testing. MM. Nieupont and Vendome have also made short flights on their respective monoplanes.

Humber-Blériots at Cannes.

CAPT. DAWES and Mr. Neale have been practising at Cannes since the 5th inst. on the two Humber-built Blériot monoplanes which Mr. Ballin Hinde has entered for the Cairo meeting. So far, however, no striking success has attended their efforts although many short trial flights have been made. On the 5th inst. Mr. Neale's machine was caught in the boggy ground and thrown forward, being slightly damaged, while on the 7th inst. Capt. Dawes had a slight accident, apparently through the machine being caught unawares in a sudden gust of wind. Some further details regarding the doings of these British flyers are embodied in a letter from a correspondent, who writes under date of Jan. 11th, from Cannes, as follows :—

"The ground here is no better than Brooklands, plenty of ditches and soft boggy ground. The track, a racecourse, is rough, and on the whole not suitable for beginners.

"Mr. Neale last Wednesday made his first attempt here, and after a short flight, in trying to turn rallied too sharply. The machine went at a dangerous angle, he righted it, and brought it to ground seemingly on the track, but it proved to be soft ground. The wheels dug in up to the hub, and the machine went forward, breaking supports, but not propeller. This is the serious accident reported generally as 'fell from a height of 16 ft.' After three days spent in repairs, spares not having arrived, he flew about a quarter of a mile quite successfully.

"Captain Dawes was not in any way injured, and has only had so far one accident. The reason for coming here was to complete his training on a good ground, but the only advantages are the quiet days, with no wind."

Breguet Flying at Douai.

ON the 5th inst. at the Brayelle Aerodrome, Douai, Breguet made three rounds of the course in 5 mins. 19 secs. at a height of ten metres, and in the afternoon he won the Vertongen prize of 1,000 francs.

M. Sommer Flying Again.

M. SOMMER has now got the first of the biplanes of his own design completed, and at its first trial at Manzor, in the Ardennes, on the 4th inst., a flight of four kilometres was made. Two other trials of similar duration were made and two days later they were again repeated.

The Napoule Aerodrome.

JUDGING by the preparations which are being made at the Napoule Aerodrome at Cannes, there should be a good deal of flying going on there shortly. Five Wright aeroplanes are being re-erected by the Société Ariel, while the Duc de Guiches has an Antoinette monoplane, and the Vicomte de Bonchamps, Comte de Mersan, and M. Maurice Bécu also intend to commence experiments there with monoplanes.

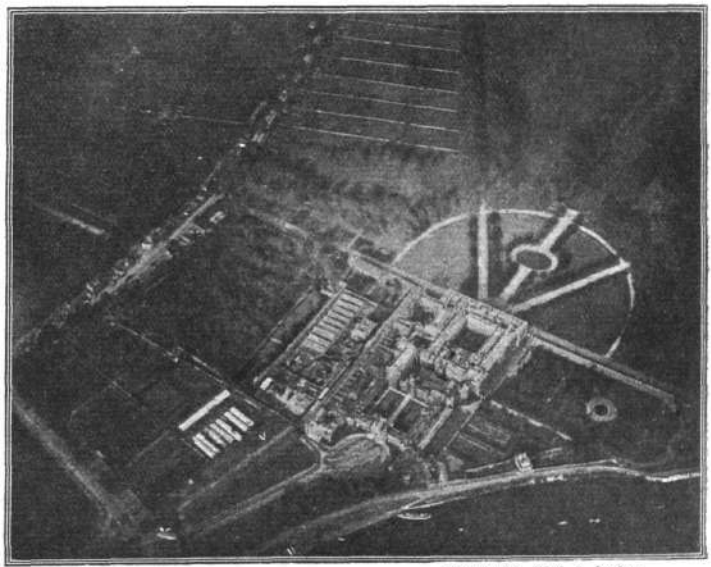


Photo by Dr. W. J. S. Lockyer.

HAMPTON COURT PALACE.—Bird's-eye view from "Corona" balloon at an altitude of 2,800 ft. on June 29th, 1908.

Parliamentary Candidates and Flight.

THE Secretary of the Aerial League wishes to urge all Parliamentary candidates who have not yet replied to his circular, regarding their attitude on the question of National Aerial Defence, to do so at once. Up to Wednesday evening 339 replies had been received, 320 being favourable, 14 are doubtful, while the remaining five are negative.

A San Remo Prize.

A PRIZE of 25,000 francs has been offered by M. Lurati, manager of the Casino at San Remo, to the aviator who in the course of the Nice and Monte Carlo flying meeting lands at San Remo. On the initiative of the *Gazetta dello Sport*, an attempt is being made to organise a flying meeting, to be held at the close of the Nice meeting, on the San Remo golf links, and to have an exhibition in the winter gardens of the Casino.

A New German Aerodrome Co.

UNDER the title of the "Flug und Sportplatz Berlin-Johannisthal," a new society with a capital of 700,000 marks has been formed to take over the aerodrome at Johannisthal. Count Wilhelm Arco is president of the new concern, with Count Sierstorpff, Capt. Kehler, and Major Tschudi constituting the managing committee, the last-named being the managing director. One of the first acts of the society has been to settle the debts of the company which was in charge of the Berlin flying week which ended so disastrously last year, both Latham and Rougier being unable to obtain their prize money. Three big meetings are being arranged for this year, one at Whitsun, another during the summer and a third during the autumn. They will be held under the patronage of both the Imperial Aero Club and the Imperial Automobile Club.

First German Aeroplane Pilot.

THE first aeroplane pilot's certificate to be issued by the German Aeronautic Association has been granted to Herr Auguste Euler, of Frankfort, who easily fulfilled the conditions of flying for 7 minutes without touching earth, the height varying from 10 to 15 metres.

Flying at Liege.

M. EMILE ALLARD, who was recently taking lessons at Chalons, has now removed his Voisin biplane to his native town, Liege, where on Friday of last week he made three very good flights of 6, 7, and 20 mins. duration respectively.

Baron de Caters at Athens.

BARON DE CATERS recently spent a few days at Athens with the intention of giving some exhibition flights on the Phaleron plain. Eventually, however, he left, without attempting any flight, because of the treatment meted out to him. Although the weather was unfavourable he found there was no shelter for his machine other than a tent, and this was partly blown away by the high wind, and as a result the aeroplane sustained damage.

Finding his request for a more suitable shelter met with no response, Baron de Caters, therefore, decided to leave the place at once.

Discontented Spectators in Algiers.

ON the 9th inst., Oleslaegers was announced to give some exhibition flights at Oran, Algiers, but the spectators were dissatisfied with the two short trials which were made, and showed their displeasure by breaking down the enclosures and making a raid on the buffet. Eventually order was restored by the military. On the following day the aviator flew for about 6 mins. at a height of 80 metres, and was loudly cheered by the crowd, while on Tuesday he flew for 54 mins., during which he made a wide sweep over the town of Oran.

Los Angeles Flying Meeting.

THIS meeting opened on Monday last with Paulhan and Glenn Curtiss as the "star turns." The latter, undeterred by the writs which have been issued against him by the Wright Brothers, made three circuits of the course, but in landing damaged his propeller. He has, however, four other machines available on the spot so that did not delay matters. Paulhan did not indulge in any flying, but stated that he would later attempt to beat all records, and to fly over the Sierra Madre, which is 1,200 metres high and snow-capped.

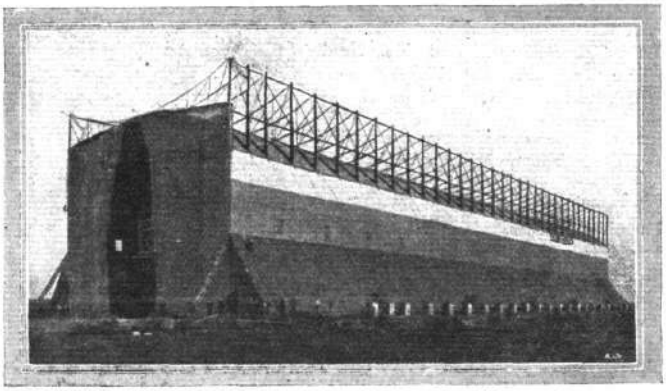
Paulhan Flies 4,146 Feet High.

THE 50,000 spectators who assembled on Wednesday to witness the flying had plenty to entertain them, for not only did Paulhan and Curtiss indulge in a series of speed trials, but Paulhan was successful in beating Latham's recent altitude record. In the course of a flight lasting 50 mins. 46⅕ secs. he rose to a height which was officially recorded as 4,146 ft., while the aneroid barometer on his machine registered 4,600 ft. He used his Henry Farman machine on this occasion, but on the previous day he was flying on his Blériot. In the speed trials the best performance was that of Curtiss, who covered a mile and a half in 2 mins. 13 secs.

Another splendid performance was that of Curtiss, who flew with a passenger for 55 miles in one hour, while a second record secured by Curtiss was in rising in 6⅘ secs. after running only 98 ft. along the ground.

Count Zeppelin Better.

ON the 6th inst. Count Zeppelin was well enough to leave the St. Catherine's Hospital at Stuttgart, where he recently underwent an operation on his throat, but for the time being he will continue to reside at his house in Stuttgart until he has quite recovered his strength.



GERMAN MILITARY AERONAUTICS.—The "Schütte" dirigible airship dock at Rheinau near Mannheim.

CORRESPONDENCE.

**** *The name and address of the writer (not necessarily for publication) MUST in all cases accompany letters intended for insertion, or containing queries.*

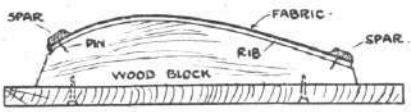
Correspondents asking questions relating to articles which they have read in FLIGHT, would much facilitate our work of reference by kindly indicating the volume and page in their letters.

NOTE.—Owing to the great mass of valuable and interesting correspondence which we receive, immediate publication is impossible, but each letter will appear practically in sequence and at the earliest possible moment.

SURFACING.

[284] In answer to your correspondent, re-surfacing, I thought the method I adopted might be useful. I made a number of wood blocks the shape of the curved ribs, and fastened them in position on a board thus, with pins, with the heads cut off to keep in position.

Having stuck one of the main spars to the fabric, I fastened it to one edge of the ribs, covered the ribs with adhesive, brought the



fabric over, and fastened the other spar down, and left until quite dry; carefully removed them from the blocks by raising them with a chisel, and screwed the webs on to the main spar from beneath. I found this quite satisfactory, and the planes kept in position without any tendency to curl. Of course the webs were already steamed and bent.

Bedford. L. HALSEY.

LARGE ELASTIC MOTORS.

[285] Would you or one of your correspondents say whether it is possible to drive a 6 ft. 2 in. spread biplane (with tail) of Voisin type by an elastic motor? I propose taking off the front elevator and using the tail for that purpose, so as to make it possible.

Doncaster. C. G. H. WILKINSON.

[A supplementary question arising out of our correspondent's letter seems to be, what is the largest size elastic motor which has been tried? F. W. Lanchester, in his early experiments, built a high-speed monoplane, 7 ft. in length, driven by twin screws under the action of two skeins of rubber, weighing together nearly ¾ lb. The energy of propulsion stored in the two skeins when fully wound up amounted in all to about 1,000 ft.-lbs.; the total number of propeller revolutions available was 500. Probably not more than 50 per cent. of the energy was usefully employed in the propulsion. The propellers were 17½ ins. in diameter, and had a pitch of approximately 20 ins. The total weight of the machine, which was of very light construction, was only 2½ lbs.

Perhaps some of our readers will give particulars of their own best efforts in this direction.—ED.]

DETAILS OF CONSTRUCTION.

[286] As many readers of FLIGHT have lately brought forward practical improvements in aeroplane and glider construction, I beg to submit a few details that, I hope, may be of use to those engaged in practical aeronautics.

In the first place, constructors will find that a large amount of timber, especially spruce, has to be thrown away owing to knots being found on the surface of long narrow scantlings, such as used for the transverse rails and tail outriggers, &c. In my case, about half the wood has been wasted on this account alone, but I have resorted to a method which has obviated the necessity of throwing away, to a great extent, an otherwise good piece of wood.

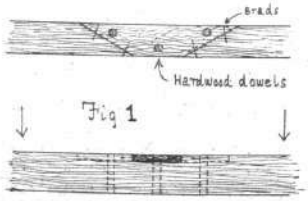


Fig 1

As shown in Fig. 1, the knot, if near the surface, is cut out and replaced by an inserted piece of hardwood cut on the skew, so that the join does not cut the wood abruptly and weaken it.

This is then dowelled and bradded in whilst the wood is being pressed downwards in the direction of the arrows; this has the effect of opening the join, allowing the spliced piece to go further in, and when released, automatically tightening up the join.

A simple method of attaching the vertical and horizontal stays to the tail outrigger or fusilage of an aeroplane or glider is shown in Fig. 2.

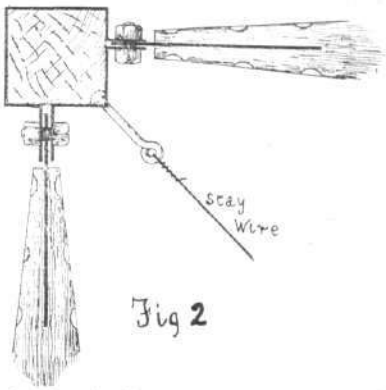


Fig 2

A couple of steel strips are bent round the outrigger as per sketch, their ends brought together over steel strips fitted into the stays; a hole is then run through the three which, when tightened, should draw the whole together.

The diagonal stay wire is attached to a stiff wire eyelet inserted in the angle of the inner steel strip.

In Fig. 3 is shown a neat and strong rocker arm for controlling the elevator, rudder, or other moving aerofoil. This can be made

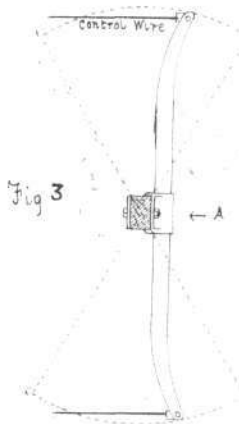


Fig 3

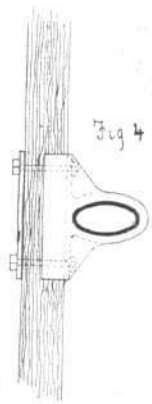


Fig 4

Plan enlarged of casting A

with two tapered oval cycle forks brazed with their butt ends together into a light malleable iron casting, which bolts on to the pivoted transverse rail.

These tapered fork tubes can also be made good use of where a light and strong lever is required for purposes of control, and many methods of utilising them will suggest themselves to the thinking constructor.

Sheffield. MACHELL MORTIMER.

TRIAL GROUND WANTED.

[287] It is my intention to try an entirely new idea in aeroplanes early this year, but being only a visitor to your country I am at a

loss as to the best way to go about it. I should esteem the favour if you or some of your readers could inform me of a good district not too far from London where suitable private workshop or garage, convenient to ground for experimental flights, could be obtained, and also which of the clubs would be most likely to be of use to a beginner.

Russell Square, W.C. "ENGINEER."

BLÉRIOT MONOPLANES.

[288] As it has been stated in the Press that the sole agency for Australia for the above has been given to a certain individual, we should be much obliged if you could find room in your paper to contradict this statement. The exclusive agency for any Colony has not and will not be given to anyone.

We are shipping and have shipped a good many of these machines to Australia and other British Colonies, and all applications should be sent direct to us. We may say that the whole output has been sold up to June, but it is possible to secure one or two machines for delivery in April at a premium.

The training ground at Croix d'Hins, Bordeaux, is now nearly ready, and arrangements can be made through us for free tuition, either here or at Pau, to purchasers of Blériot machines.

53-54, Long Acre, W.C. BLÉRIOT, LTD.

TIMBER.

[289] In reply to the letter of Mr. L. Mortelmans in your issue of the 18th December, and also to many other enquirers for light wood framing for model building, we would draw the attention of your readers to our advertisement of *Special American Bentwood*, which appears once a month in your advertising columns.

This is specially imported by us, and machined up in our own works; it is supplied in lengths from 2 ft. by $\frac{5}{16}$ in. square, but owing to the restrictions of the postal authorities all lengths over 2 ft. have to be forwarded by rail. When we say that our works cannot make this fast enough to supply the wants of readers of FLIGHT, to say nothing of other less popular journals, we think we may fairly claim to supply "a long felt want."

Varnish.

In reply to Mr. Fred Collins, *re* varnish for planes, we use the best quality paper varnish, and find this answers admirably.

It can be obtained at any good varnish dealers, is quite colourless, and if applied in a warm room on a previously sized surface will be bone dry in twenty-four hours.

Wood Cutting.

We should like to tender our thanks to Mr. Henry Bath for his valuable advice on wood-cutting in the letter headed "Ash *v.* Spruce" in the same issue; we think many manufacturers who are engaged in cutting wood for aeroplane making will be as grateful as we ourselves are to him for his many useful hints.

Guildford. H. FENTUM PHILLIPS & Co.

LOADING OF GLIDERS.

[290] As a constant reader of FLIGHT I should be very much obliged if you would be so good as to answer the following queries:—

1. Is there any reason why one should not construct a glider on the monoplane principle? With a span of 30 ft. and a chord of 6 ft. the lifting surface would be greater than that of the Blériot machine, and the weight, I should think, might easily be made half of it, as there would be no engine, tanks, fuel, or wheels. Simplicity of construction would also be a point of superiority over the biplane. If such a machine was made do you think it would have a reasonable chance of success?

Minimum Power for Flight.

2. I have heard that there is no theoretical reason why one should not fly under power with a 5-h.p. motor weighing, say, 30 lbs. Mr. Parkes' 40 ft. "jumps" would seem to bear this out. Could you inform me as to this? W. W. SMITH.

[1. A monoplane with a span of 30 ft. and a chord of 6 ft. would have an area of, say, 180 sq. ft. An average pilot weighs at least 150 lbs., so that even with a very light form of construction for the glider itself the loading would run well over 1 lb. per sq. ft. While this value would be low for a flying machine, it is high for a glider, inasmuch as to produce the necessary supporting reaction from the air it would require a higher velocity of gliding flight than could either be conveniently obtained or would be safe to attempt. Up to the present time there are, unfortunately, no really authenticated figures based on practical work that enable such speeds to be determined in advance with any degree of nicety, but it is interesting, at any rate, to take a glance at Lanchester's load table (*see* FLIGHT, page 297, Vol. I) in order to get a theoretical view of the case. There it will be seen that an aspect ratio of 5, which is that of a machine with a 30 ft. span and 6 ft. chord, needs a minimum of 20 miles an hour to reach its supporting velocity under a load of about one pound per sq. ft. Those values are, as a matter of fact, calculated for the planes themselves, and neglect the resistance of any supplementary framework and the pilot; they further assume that the planes have been designed in accordance with the laws of minimum resistance. The actual speed required would thus be much higher.

In gliding, it is necessary to acquire the greater part of the velocity by virtue of a head wind, because it is not commonly convenient to launch a machine at a speed exceeding 4 or 5 miles an hour; the limiting velocity is therefore determined by the maximum velocity of the head wind in which it is safe to experiment. On page 334 of FLIGHT, Vol. I, we discussed the area of gliders and suggested limitations represented by 15 m.p.h. head wind and a 5 m.p.h. launching velocity, thereby making a total speed of 20 m.p.h. through the air. We further suggested that the loading should be about half a pound per sq. ft., and although this is possibly unnecessarily low, we should hardly recommend preliminary experiments to be made with the loading in excess of $\frac{3}{4}$ lb. per sq. ft. until there is more evidence in favour of a higher value.

2. The minimum theoretical h.p. required for flight was discussed on page 335 of FLIGHT, Vol. I. Assuming a total load of 400 lbs. to be sustained at 35 m.p.h. with a thrust of 67 lbs., the actual h.p. represented by the performance is only 6½ h.p. To this must be added the losses in transmission, which would at least double the amount. It is improbable that a practical machine can at present be built to carry a pilot of average weight, which shall weigh very much less than 400 lbs., but we have always maintained that this end of the scale offers a useful and interesting field for experiment, inasmuch as it leads to the evolution of a light and handy flyer of moderate speed. Moderate speed and light weight mean a great deal to the beginner, if only on the score of reduced liability to damage when alighting on *terra firma*.—ED.]

KITE CORDS.

[291] Replying to an inquiry from M. J. Carroll, page 785, issue 49, December 4th, regarding cord for large kites, we believe that a plaited or braided cord will give the best results, for the following reasons:—

It gives greater strength for a given weight of material, is very flexible, does not twist or curl upon itself, can be made in any length without knots and to any given breaking strain.

We are builders of machines for the production of cords of this class, and if your correspondent cares to send his address we shall be pleased to communicate with him with a view to making experiments and giving to those interested the benefit of the experience thus gained.

Nottingham. STANDARD MACHINE WORKS, LIMITED.

[The sample of cord submitted to us by our correspondent is somewhat suggestive of circular lamp wick in appearance. It is very soft and should be more pleasant to handle than string. It can be twisted in either direction without unravelling.—ED.]

C.P. AND C.G.

[292] As a subscriber to your excellent paper, I should be glad if you would, through the medium of your columns, enlighten me.

I have made a model monoplane, Antoinette type. Would like to know where centre of balance should be, if in centre of main planes or at trailing edge.

Wimbledon. F. S.

[Assuming that the tail does not carry load, and that the centre of pressure on the main planes is about one-third of the chord from the leading edge, then the complete model should be in balance in the centre of a line drawn between the wing tips at this point.—ED.]

CHEAP GLIDERS.—WORKING DRAWINGS OF GLIDERS.

[293] Do you know of anyone who could supply me with detail sketches of a glider which is entirely practical, and not too expensive to make? I have already started on one, but somehow or other things are working out rather heavily. A little help as to where to procure the necessary design would be cordially appreciated. Wishing your interesting paper every success, and thanking you in anticipation.

GERALD T. NEWENHAM-DEANE.

Barrow-in-Furness.

[If a gliding machine is successful, the operator must always be prepared to find himself some 20 ft. or 30 ft. aloft above the ground, and in that moment it will not add to his peace of mind if a thought

suddenly flashes into his brain, reminding him of how he made economy the first consideration in the construction of the machine to which he has entrusted his life. Pilcher, the first among British pioneers of gliding, was killed through the fracture of a main spar.

We do not wish to imply by the above that our correspondent is likely to build an unsafe machine ; on the contrary, he distinctly states that it must be "entirely practical." On the other hand, we have sometimes felt that those who write to us about the construction of full-size gliders and flying machines are just a little apt to overlook the above-mentioned result of success, and we are taking this opportunity to remind all whom it may concern.

We do not know anyone who is at present making a speciality of supplying detailed drawings of full-sized machines, but possibly some of our readers might be willing to dispose of their own.—ED.]

PROPELLERS.

[294] In answer to Mr. Challenger, December 25th, page 838, drawing attention to the error in Maxim's "Artificial and Natural Flight," the following calculation with respect to the stationary thrust is more scientific and may prove instructive :—

If A is the disc area, V the velocity in feet per sec., ·08 the weight of a cubic foot of air, the thrust $= \frac{\cdot 08\ AV^2}{32}$, the h.p. $= \frac{\cdot 08\ AV^3}{2 \times 32 \times 550}$.

In the example the h.p. is given $= 363 \cdot 63$.

$$\therefore\ 363 \cdot 63 = \frac{\cdot 08 \times 500 \times V^3}{2 \times 32 \times 550}.$$

$$V = \sqrt[3]{\frac{363 \cdot 63 \times 2 \times 32 \times 550}{\cdot 08 \times 550}} = 68 \text{ ft.}$$

This means, in a theoretically perfect screw throwing air away from its full disc area, the maximum possible velocity is 68 ft. per sec. The greatest thrust possible is $\therefore \frac{\cdot 08 \times 500 \times 68 \times 68}{32} = 5{,}780$ lbs.

The actual thrust obtained was $= 2{,}160$ lbs. The thrust efficiency is, therefore, $\frac{2{,}160}{5{,}780} = 0 \cdot 38$. If the velocity of air ejected by the screw had been measured from the centre to the extremity, it would have been found to vary considerably, being very much less than the pitch multiplied by the number of turns per second, towards the centre, and approaching this figure at about two-thirds of the radius.

From this it would always seem best to always consider the full disc area of the screw, but when the pitch multiplied by number of revolutions per second is very much in excess of the theoretical velocity, V, the stationary thrust efficiency is likely to be low.

The maximum stationary thrust efficiency obtainable is about 65 per cent.

When the screw under consideration is moving forward at 40 miles an hour it becomes more efficient, as it is capable of acceleration from 60 ft. per second (40 miles per hour) to 100 ft. per second (pitch multiplied by number of turns), which is a very different thing to accelerating the air from 0 to 100, which the screw tries to do when stationary.

London, W.C. J. R. PORTER, A.M.I.C.E.

WRIGHT GLIDER LAUNCHING APPARATUS.

[295] REFERRING to the short article in to-day's FLIGHT about the launching apparatus for our Wright glider, I beg to draw your notice to several modifications of interest to other experimenters.

In the first place, our second and most successful rail was only 40 ft. long, giving 33 ft. run. The rail was in two sections of 20 ft. each, consisting of 6 in. by 1½ in. timber, supported every 10 ft. on feet which were 6 ins. high. The feet were set across the rail and ¾-in. angle iron stakes, of ⌊-section, held the whole together and projected into the ground some 6 ins. These were necessary to take the pull of the weight.

The glider ran on 1 in. angle iron of ⊥-section. The rail was usually on a gradient of 1 in 7, and about 10 ft. away from the derrick, which appears to be about correct in the article.

The wire rope was ⅜ in. in circumference, and ran over 2 in. pulleys (steel) and was attached to the glider by a ring on to a hook on the front wheel bearer.

The glider was held back by a spring catch on the front boom.

The weights were 4 discs, 100 lbs. apiece, of cast iron, with a hole in the centre.

The wire rope was reeved through a three-fold purchase in the derrick and led out under the rail, round a pulley at the end of the rail, and back to the machine. The weights were hoisted by a four-fold manila fall attached by another short rope to the wire behind the ring by means of a slip-knot. The other end of the fall was fixed to the foot of the derrick.

So two men walking down the hill could easily raise the weights, and the ring on the wire rope could be hooked on to the glider without difficulty.

If the wind was blowing fairly strongly up the hill, only two of the weights were necessary.

It was just possible to get the machine into the air in a calm, using the full run of 33 ft. and four weights. This gliding in a calm, which as a matter of fact we only got on one or two days owing to the bad weather, we found very pleasant and instructive.

The arrangements were, no doubt, rather elaborate, but were compensated for by getting many glides of over 400 yards.

Camber. ALEC OGILVIE.

HOLLOW SPARS.

[296] I have read with interest the letter of Mr. Linton Hope in the issue of FLIGHT of the 1st inst. regarding hollow silver-spruce spars. Will Mr. Linton Hope or any of your readers oblige me by giving the address where such hollow spars are made.

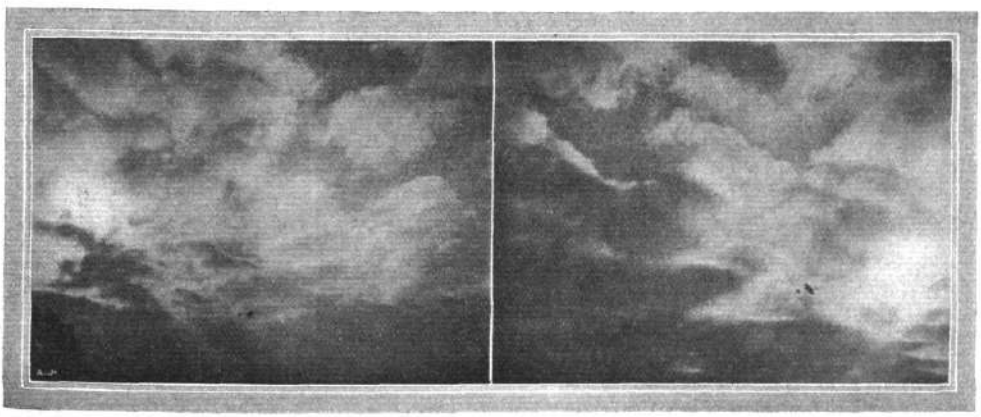
London, E.C. B. H. BALASSANIAN.

"FAKED" FLIGHT PHOTOGRAPHS.

[297] I noticed in your issue of Jan. 1st a "faked" photograph ("flying in the clouds") as the frontispiece. I beg to enclose two genuine photographs, taken by myself at Brooklands, of Paulhan flying. I thought, possibly, these might be of some use to you.

Maida Vale. F. A. HALFORD.

[These interesting photographs sent by our correspondent are a striking object-lesson of the size of a flyer as really seen by the camera at fair heights.—ED.]



Two *Genuine*, not "faked" photos of Paulhan flying high at Brooklands (see Mrs. Halford's letter).

DEGREES, NOT PER CENT.

[298] I must have made a very stupid mistake and written 10 per cent. instead of 10°, which is, of course, what all the 10 per cents. should read as, in my letter which you published in FLIGHT, January 1st, page 15. All the per cents. should read as degrees.

Hollow Spars.—With regard to the hollow spars referred to by Mr. Linton Hope, I should have liked to use these instead of bamboo, and wrote to the only Irish firm that makes them, but the price, as far as I was concerned, put them out of the question. They were quoted at 2*s.* per ft. for spars about 1½ in. in diameter.

Propeller Thrust.—With regard to propeller thrust, I wish you would get some practical person to write on this subject. I have been told that the thrust should be one-tenth the total weight of machine; the gliding angle will give head resistance, but the thrust of propeller has first to raise the machine off the ground, and there is the friction of wheels or skids. Some articles on making propellers would be interesting and useful, both as to the built up and cut to template kinds, also more information re direct or gear-driven propellers, but apparently experts all differ on this subject.

Surfacing.—I have got my fabric on without a crease; it is laced back and front on the planes, then sewn over where the edges meet, and then coated with my gelatine formula and it dries as tight as a drum. I am using unbleached calico, which, by the way, is full of powder, and one can take 2 or 3 lbs. weight off the planes by washing it first, to get the powder out; one also has to allow for it stretching, the fabric naturally follows the top curve and the under surface is tacked to the ribs, but both surfaces are first strained up tight with the whipcord lacing, the two surfaces are punched out together so that the eyeholes are opposite each other. I use a bootmaker's punch and boot eyes, as the stuff is 6 ft. wide there are no seams, except where the side pieces will join the centre frame.

The wire on trailing edge is run through the picture screws, which are screwed into the end of each rib, and the lacing is pulled over the wire—in front the lacing is on main spar; it takes me about 3½ hours to cover and coat one wing, but then I have to take off each wire, and get the sockets through in the right place, which is by no means easy work; a monoplane would be much easier. The edges of fabric must, of course, be machined round, and holes punched in the two or three thicknesses of hem. I mean the fabric is turned in two or three times to give a solid hem to punch in.

Belfast. LILIAN E. BLAND.

ACCIDENTS AND THEIR LESSONS.

[299] There appears to be one lesson standing out in bold type to be learned from all these fatal accidents, viz., to be strapped securely in the areoplane. In nearly all the fatal accidents the pilot has left the machine and fallen to the ground; of course it is an easy matter for a man to get killed by a direct fall of only a few feet, but he may fall a considerable distance in a crippled aeroplane, and the planes and framework, however much damaged, will save him from the direct fatal concussion with the ground. For instance, Santos Dumont was saved by getting entangled in the wires, and there are dozens of others who have been saved in the same way. On the other hand, M. Delagrange was thrown out of his machine and killed. I believe that Lilienthal, Pilcher, Lieut. Selfridge, Lefebvre and Fernandez all fell from their machines, which is a total list of fatalities, except Capt. Ferber, whose machine fouled the ground in turning, overturning the machine and pinning him under the engine.

I am writing this with the hope that the suggestion may save other similar fatalities. It may be of general interest to hear other opinions on the subject.

Park Royal. OLIVE PRYCE.

FIRST FLIGHT IN IRELAND.

[300] Just a note to correct a mistake in the description of Mr. Ferguson's flight in Ireland last week. The propeller he used was only 6 ft. 4 in. in diameter, not 7 ft. WILLIAM COCHRANE.

OLYMPIA EXHIBITION.

[301] IN a recent issue, under the heading of "The Aero Club of the United Kingdom" you have a notice of the Aero Exhibition at Olympia. I should be very glad if you would let me know if the exhibition of models is only open to members or to all.

Speed of Model Motors.—Will you also let me know how many r.p.m. the "Aero" and the "Flier" motors (advertised by the Economic Electric Co.) revolve at, with a charge from one of the 4*s.* accumulators especially made for them. Thanking you in anticipation.

Paddington. E. D. H.

[The Exhibition at Olympia is open to all exhibitors.

The question relating to the speed of model motors has been placed before the makers, who reply that the speed is from 2,000 to 3,000 r.p.m.—ED.]

DIARY OF FORTHCOMING EVENTS.

British Events.

1910.		1910.	
Feb 4–5 ..	Manchester Ae. C. Model Exhibition.	July 11–17	Flight Meeting, place not fixed.
Mar. 11–19	Flight Exhibition at Olympia.	Aug. 6–13	Flight Meeting, place not fixed.

Foreign Events.

1910.		1910.	
Feb 6–13..	Heliopolis.	July 14–24	Rheims to Brussels, cross country event.
April 2–10	Biarritz.	July 24–Aug. 10	Belgium.
April 3–10	Cannes.	Aug. 25–Sept. 4	Deauville.
April 10–25	Nice.	Sept. 8–28	Bordeaux.
May 10–16	Berlin.	Sept. 24–Oct. 3	Milan.
May 14–22	Lyons.	Oct. 18–25	America. Gordon-Bennett Balloon Race.
May 20–30	Verona.	Oct. 25–Nov. 9	America. Gordon-Bennett Aeroplane Race.
June 5–12	Vichy.		
June 5–15	Budapest.		
June 18–24	St. Petersburg.		
June 26–July 10	Rheims.		

Aeronautical Patents Published.

Applied for in 1908.

Published January 20th, 1910.

28,321. J. FAWCETT. Airships.
28,558. L. LORANT AND B. KORMOS. Controlling aerial machines.

Applied for in 1909.

Published January 20th, 1910.

13,608. S. LAKE. Airship.
23,309. R. ESNAULT-PELTERIE. Flying machines.

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